Index

Acoustic and ototoxic insults, 30
Ageing and hearing loss, 32–33
Aminoglycoside-induced hearing impairment, 89
Anti-apoptotic agents, 31
Anti-oxidants, 30–31
Apoptosis of hair cells, 28–29, 160–161
Application of new biological approaches to stimulate sensory repair and protection: **Holley MC**, 157–169
Ashmore J: Biophysics of the cochlea – biomechanics and ion channelopathies, 59–72
Aspirin and protection from ototoxic doses of aminoglycosides, 161
Attention and auditory development, 171–181
Audiometry, 109
Auditory agnosia, 112, 114–115
Auditory brain stem
implant (ABI), 188–189
responses (ABR), 160, 161
Auditory deficits associated with dyslexia, 139–142
Auditory development and the role of experience: **Moore DR**, 171–181
Auditory experience, the nature of, 175
bad experience, 175–177
good experience, 177–179
Auditory nervous system, development of the, 172–175
Auditory processing and the development of language and literacy: **Bailey PJ, Snowling MJ**, 135–146
Auditory processing in disorders that are not specific auditory disorders, 116–117
Auditory Repetition Task (ART), 138–140
Auditory temporal order judgements, 139–140
Autosomal dominant inheritance of HI, 74, 85
Autosomal dominant non-syndromic deafness, 85–88
Autosomal recessive inheritance of HI, 74, 79–84

Backward masking and dyslexia, 142
Baguley DM: Mechanisms of tinnitus, 195–212
Bailey PJ, Snowling MJ: Auditory processing and the development of language and literacy, 135–146
Balance and vision disorders, 213–221
Basal cells, 20–21
Basilar membrane (BM), 17–18, 229–233
Bilateral vestibular schwannomas (acoustic neuromas), 188
Binaural and spatial hearing, 175
Binaural processing and dyslexia, 142
Biophysics of the cochlea – biomechanics and ion channelopathies: **Ashmore J**, 59–72
Bitner-Glindzicz M: Hereditary deafness and phenotyping in humans, 73–94
Brain stem and cochlear implants, 179–189
Brain stem disorders, 112–113
Brain-derived neurotrophic factor (BDNF), 159
Bronstein AM: Under-rated neuro-otological symptoms: Hoffman and Brookler 1978 revisited, 213–221
Bryant J, Goodyear RJ, Richardson GP: Sensory organ development in the inner ear: molecular and cellular mechanisms, 39–57

c-Jun N-terminal kinase (JNK) pathway, 160
Cell death and hair cell regeneration, 25–38
Cell lines and stem cell therapy, 35
Cell transplantation, 164–165
Central auditory disorders, clinical assessment of, 108–112
Central auditory function, microelectrode and neuroimaging studies of, 95–105
Central auditory pathologies: **Griffiths TD**, 107–120
Cerebello-pontine angle lesion, 218
Cerebrum, higher level disorders, 113
Channelopathies, 66–69
Characteristic frequency (CF), 121, 122, 125–127, 129
Chromosomal inheritance of HI, 74
Ciliary neurotrophic factor (CNTF), 160
Click stimulus in the new-born, 223
Clinical assessment of central auditory disorders, 108–112

© The British Council 2002

Cochlea mechanics, 59–66
active versus passive, 60–91
converting sound into electricity, 61–62
converting electricity into sound, 62–63
cochlear amplification, 63–66
Cochlea, biophysics of the – biomechanics and ion channelopathies, 59–72
Cochlear
amplification, 63–66
compression, using forward masking, 121–126
function and use – otoacoustic emissions, their origin in, 223–241
models of tinnitus generation, 196–199
obliteration (osteoneogenesis), 186
Cochlear implants and brain stem implants: **Ramsden RT**, 179–189
Cochlear pathology, sensory cell death and regeneration: **Raphael Y**, 25–38
Complex sounds and speech, 100–103
Congenital auditory agnosia, 115
Congenitally deaf children, candidates for implants, 182–185
Conversion of supporting cells to hair cells, 163
Corti, organ of, molecular architecture, 6–21

Dark cells of the vestibular system, 19–20
Dead regions in the cochlea, diagnosis of, 126–131
Deiters' cells, 16–17
Development (auditory) and the role of experience, 171–181
Development of the sensory hair bundle, 50–52
Difference limens for frequency (DLF), 140–142
Differential diagnosis using OAEs, 237
Differentiation of hair and supporting cells, 39, 43–50
Distortion product otoacoustic emissions (DPOAEs), 161, 164, 225–227
Double vision and skew eye deviation in vestibular disease, 214–218
Down syndrome and inheritance of HI, 74
Drug delivery, 165
Dyslexia and
auditory development, 178–179
specific language impairment (SLI), 135–146

Electroencephalography (EEG)
and central auditory function studies, 95–105, 116
and evoked potentials, 108, 109–110
Electromechanical transduction: converting electricity into sound, 62–63
Electronic aids to hearing: **Gatehouse S**, 145–156
Embryonic stem cells (ESCs), 164
Endocochlear potential (EP), 6, 19–21
Endolymph, 6, 14, 19–21, 25
Environmental hearing impairment, 74
Epidemiology of hearing impairment (HI), 77–79
Evoked auditory brain stem response (EABR), 188
Evoked potentials and EEG, 108, 109–110
Experience, auditory development and the role of, 171–181

Feedback ('whistling') and hearing aids, 150
Focal adhesion kinase (FAK), 52
Foramen of Luschka, 179, 188
Forge A, Wright A: The molecular architecture of the inner ear, 5–24
Frequency discrimination, 140–141
Frequency, tonotopicity and pitch, 96–98
Functional magnetic resonance imaging (fMRI) and central auditory function studies, 95–105, 108, 112, 115, 178–179

Gatehouse S: Electronic aids to hearing, 145–156
Gene therapy, 163–164
Generation and specification of sensory organs, 41–43
Genes that specify the hair cell phenotype, 35
Genetic causes of HI, 73–94
Glial-derived neurotrophic factor (GDNF), 164
Goodyear RJ *see* **Bryant J**
Griffiths TD: Central auditory pathologies, 107–120
Growth factors and therapy with, 159, 161–162

Hair cells (HC), 7–12, 14–18
hair bundle (sensory),
development of the, 50–52
and cuticular plate, 7–12
ligand-gated channels, 68–69
potassium channels, 66–68
regeneration, 33–35
and supporting cells, 39–57

loss and replacement of, 25–38
Head trauma and HI, 74
Hearing impairment (HI), hereditary, 35–36, 73–94
Hereditary deafness and phenotyping in humans: **Bitner-Glindzicz M**, 73–94
Heschl's gyrus, 97, 100, 107, 110, 114–116
History and examination, 108–109
Hoffman and Brookler 1978 revisited: under-rated neuro-otological symptoms, 213–221
Holley MC: Application of new biological approaches to stimulate sensory repair and protection, 157–169
Horizontal vestibular-ocular reflexes (HVORs), 162
Human recombinant glial growth factor 2 (rhGGF2), 162

Inheritance of HI, 22q11 deletions and, 74
Imaging (neuro-) and microelectrode studies of central auditory function, 95–105
Immune system, role of the, 32
Implants, cochlear and brain stem, 179–189
Infections and HI, 74
Inner ear
dysplasia, 186
molecular architecture of the, 5–24
sensory organ development in the: molecular and cellular mechanisms, 39–57
Inner hair cells (IHCs), 14–16, 18
destruction of, 126–131
ion channels, 66–69
Integrins, 52
Intensity and loudness, 98–99
Inter-stimulus interval (ISI), 138
Intermediate cells of the SV, 19, 20
Ion channelopathies and biomechanics, biophysics of the cochlea, 59–72
Ion transporting epithelia, 19–21

Jastreboff neurophysiological model of tinnitus generation, 199–200

Kemp DT: Otoacoustic emissions, their origin in cochlear function, and use, 223–241
Kinocilium, 7–12, 50

Landau Kleffner syndrome (acquired epileptic aphasia), 109
Language and literacy, auditory processing and the development of, 135–146
Language learning impairments, 135–146
Large vestibular aqueduct syndrome, 186
Lateral plasma membrane, 9, 12, 14, 16
Ligand-gated channels, hair cell, 68–69
Lineage and birth of hair and supporting cells, 43
Literacy and language, auditory processing and the development of, 135–146
Loudness and intensity, 98–99
Low birth weight and HI, 74

Magnetoencephalography (MEG) and central auditory function studies, 95–105, 117
Marginal cells of stria vascularis, 19–20
Masking (forward) to assess cochlea compression, 121–126
Maternally inherited hearing impairment, 88–89
Mechanisms of tinnitus: **Baguley DM**, 195–212
Mechano-electric transduction: converting sound into electricity, 61–62
Mechanotransduction, process of, 50
Melanocytes, 20
Menière's syndrome, 6, 196
Meningitis and HI, 74
Microelectrode and neuroimaging studies of central auditory function: **Palmer AR, Summerfield AQ**, 95–105
Microelectrode and neuroimaging studies of central auditory function, 95–105
Middle ear factors and OAEs, 237
Mismatched negativity (MMN), 110, 116
Mitochondrial inheritance of HI, 74, 88–89
Molecular architecture of the inner ear: **Forge A, Wright A**, 5–24
Molecular basis of cochlear amplification, 63–66
Mondini deformity, 186
Moore BCJ: Psychoacoustics of normal and impaired hearing, 121–134
Moore DR: Auditory development and the role of experience, 171–181
Mosaic trisomy 8 and inheritance of HI, 74
Motion hypersensitivity, development of visual, 213
Motorist disorientation syndrome, 218
Movement and spatial position of sound source, 99–100
Multiple sclerosis (MS), 113
Musical hallucinations, 116

N-methyl-D-aspartate (NMDA) receptors, 159–160
Neonatal hypoxia and HI, 74
Neonatal jaundice (severe) and HI, 74
Neuro-otological symptoms, under-rated: Hoffman and Brookler 1978 revisited, 213–221
Neurofibromatosis type 2 (NF2), 188
Neuroimaging and microelectrode studies of central auditory function, 95–105
Neurological patients evaluatuion, 111
Neurostimulators, implantable prosthetic, 179–189
Neurotrophic factors, 30
Neurotrophin-3 (NT3), 159
New-born and click-stimulus screen, 223–226
Noise exposure and HI, 74
Non-cochlear models of tinnitus generation, 199–207
Non-rotational dizziness, 213
Notch signalling, 39–57
Nuel, space of, 17

Olive cells , 99
Osteoneogenesis, 186
Otoacoustic emissions
  differential diagnosis using, 238–239
  interpretation of, 238
  and middle ear factors, 237
  and nature of sensory hearing loss, 237
  special applications of, 239
Otoacoustic emissions (OAEs), their origin in cochlear function, and use: **Kemp DT**, 223–241
Otocyst, 39
Otosclerosis, 196
Ototoxic and acoustic insults, 30
Ototoxic drugs and HI, 74, 158–161, 163
Outer hair cells (OHC), 14–18
  ion channels, 67–69
Pain, analogies of tinnitus with, 207–208
Palmer AR, Summerfield AQ: Micro-electrode and neuroimaging studies of central auditory function, 95–105
Pathologies, central auditory, 107–120
Perilymph, 6, 25
Phenotypic conversion, 34
Pillar cells, 16–17
Pitch, frequency and tonotopicity , 96–98
Positive disorders of central auditory processing, 114–116
Positron emission tomography (PET) and central auditory function studies, 95–105, 112, 115, 116
Postlingually deafened adults, candidates for implants, 182–185
Potassium channels, hair cell, 66–68
Prelingually deaf children, candidates for implants, 182–185
Prematurity and HI, 74
Prevention of hair cell death, 30–32
Prosthetic neurostimulators, implantable, 179–189
Protection and repair (sensory), application of new biological approaches to stimulate, 157–196
Protection of hair cells and neurons, 159–161
Psycho-acoustic assessment, 108, 110–111
Psychoacoustics of normal and impaired hearing: **Moore BCJ**, 121–134
Psychophysical tuning curves (PTCs), 126–130

Ramsden RT: Cochlear implants and brain stem implants, 179–189
Raphael Y: Cochlear pathology, sensory cell death and regeneration: , 25–38
Receptor-like protein tyrosine phosphatase (RPTP), 163
Recording otoacoustic emissions, 236
Regeneration and hair cell death, 25–38
Regeneration of hair cells and neurons, 161–163
Reissner's membrane in the cochlea, 6
Repair and protection (sensory), application of new biological approaches to stimulate, 157–196
Repair of injured cells, 32–33
Retinoic acid and thyroid hormone, roles of, in hair cell differentiation, 49–50
Richardson GP *see* **Bryant J**
Rootlets, 50
Rubella and HI, 74

Scar formation, hair cell elimination and, 26–28
Schwannomas (acoustic neuromas), bilateral vestibular, 188
Sensorineural hearing impairments, interventions for, 145–156
Sensory cell death and regeneration, 25–38
Sensory hair bundle, development of the, 50–52
Sensory hearing loss and OAEs, 237

Sensory organ development in the inner ear: molecular and cellular mechanisms: **Bryant J, Goodyear RJ, Richardson GP**, 39–57
Sensory recovery, the challenge of, 157–158
Sensory repair and protection, application of new biological approaches to stimulate, 157–196
Skew eye deviation and double vision in vestibular disease, 214–218
Smoke detectors or doorbells that cause a light to flash or provide a vibratory sensation, 155
Snowling MJ *see* **Bailey PJ**
Space and motion discomfort, 218
Spatial position and movement of sound source, 99–100
Specific language impairment (SLI) and dyslexia, 135–146
Speech and complex sounds, 100–103
Speech and non-speech sounds, tasks involving, 143
Speech perception, normal development of auditory processing in relation to, 136–138
Spiral ganglion neurons (SGNs), 157–160, 164–165
Spontaneous OAEs (SOAEs), 235
Stem cell therapy and cell lines, 35
Stereocilia, 7–12
Stria vascularis (SV), 19–21
Structural imaging, 108, 111–112
Summerfield AQ *see* **Palmer AR**
Supporting and hair cells, 39–57
Supporting cells, 16–17

Tectorial membrane (TM), 18
The molecular architecture of the inner ear: **Forge A, Wright A**, 5–24
Therapeutic targets, cellular and molecular, 158–159
Threshold-equalising noise (TEN), 127, 130, 133
Thyroid hormone and retinoic acid, roles of, in hair cell differentiation, 49–50
Thyroid hormone receptors (TR), 50
Tinnitus, 114–116
  mechanisms of, 195–212
Tonotopicity of the cochlea, 179
Tonotopicity, frequency and pitch, 96–98
Toxoplasmosis and HI, 74
Transient evoked oto-acoustic emission (TEOAE) 223–226, 233, 235-237
Travelling wave (TW), 228–234
Trisomies 13 & 18 and inheritance of HI, 74
Turner syndrome and inheritance of HI, 74
Tympanomastoid disease, 186
Types of otoacoustic emissions, 236–237

Under-rated neuro-otological symptoms: Hoffman and Brookler 1978 revisited: **Bronstein AM**, 213–221
Usher's syndrome,

Vertigo, 213
Vestibular disorders and balance, 213–221
Vestibular schwannoma, 196
Vision blurred and double, 213
Visual influences on vestibular symptoms, 218–220
Visual vertigo syndrome, 218
Visuo-vestibular mismatch, 218

Wright A *see* **Forge A**

X-linked inheritance of HI, 74